



Warfighter Biomedical Status Monitor: Sustaining Soldier Performance in Real-Time

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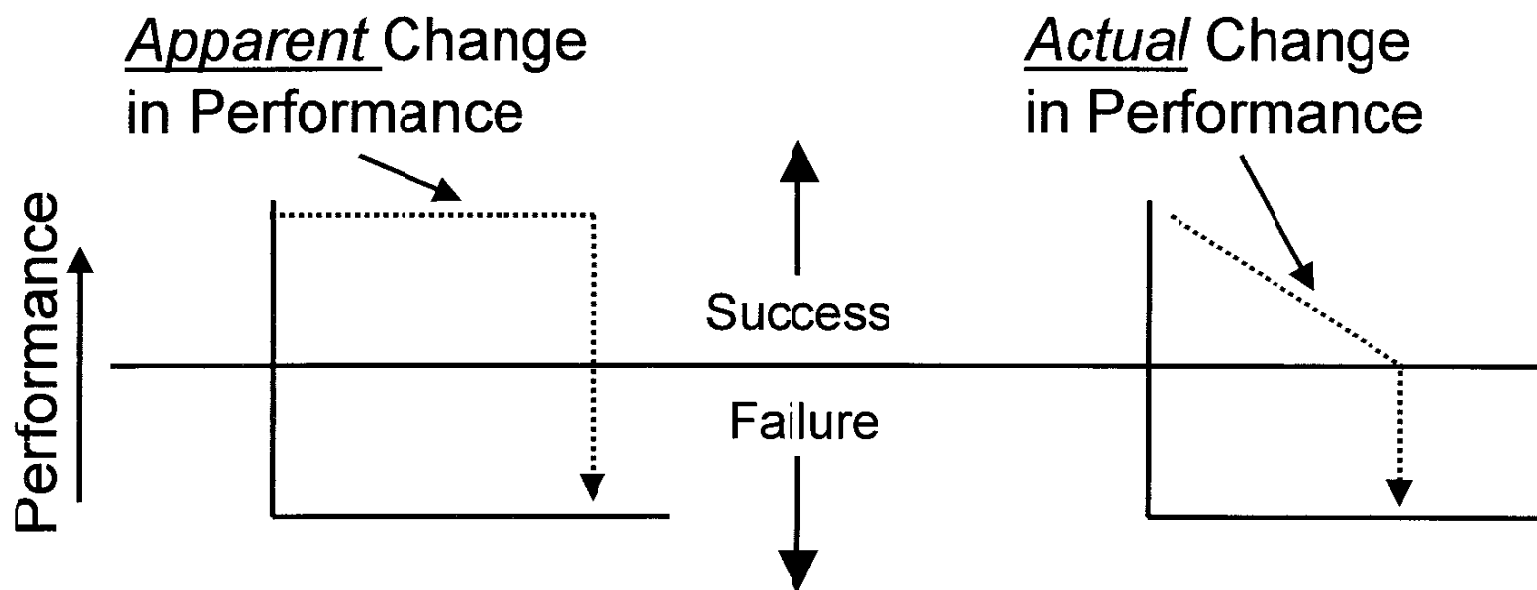
The Tip of the Spear

- The tip of the Army spear (the soldier, the small unit) will be sharp but brittle
- Current and future Army concept of operations could easily exceed human limits no matter how carefully selected, well-trained, or well led the soldiers and units
- The AAN paradigm (similar to SOF):
 - dispersed in 3-5 person teams depend upon the excellent performance of each team member
 - if a team member fails, the team will fail
 - if a team fails the operation is at risk
- A team can fail suddenly, and, at first observation, unpredictably



Sudden Collapse or Graceful Degradation?

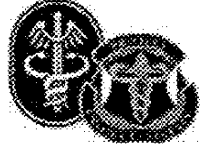
- Sleep deprivation-induced orderly decreases in performance and productivity *precede* accidents and catastrophic failures





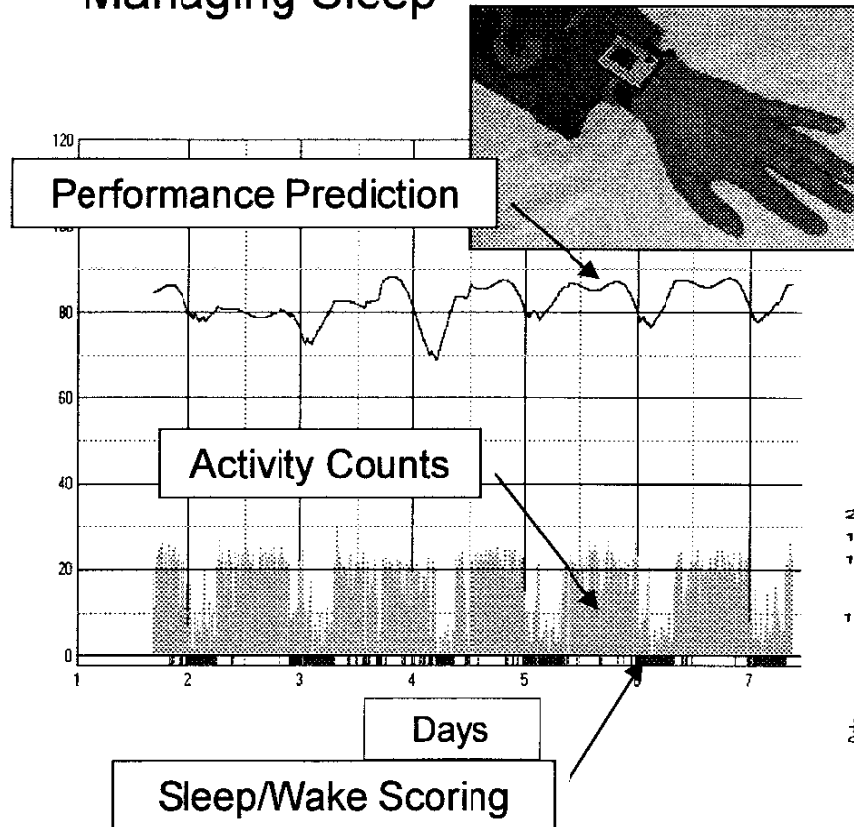
Biomedical Status Monitoring

- The medical equivalent of the Global Positioning System (GPS)
- Sensors for vital signs, electrolytes, stress hormones, neurotransmitter levels, physical activity, etc.
- Locate the soldier in physiological space as GPS does in geographic space
- Software for integrated adaptive biomedical monitoring from multiple sensor
- Integrated into Land Warrior, Warrior's Medic, Warfighter Status Monitor, and GCCS/GCSS
- Dynamic operational planning with biomedical input to pace operations at sustainable tempo
- Anticipate/prevent casualties
 - heat stress
 - dehydration
 - performance failures from sleep deprivation
 - combat stress casualties
- Detect casualties, guide initial treatment

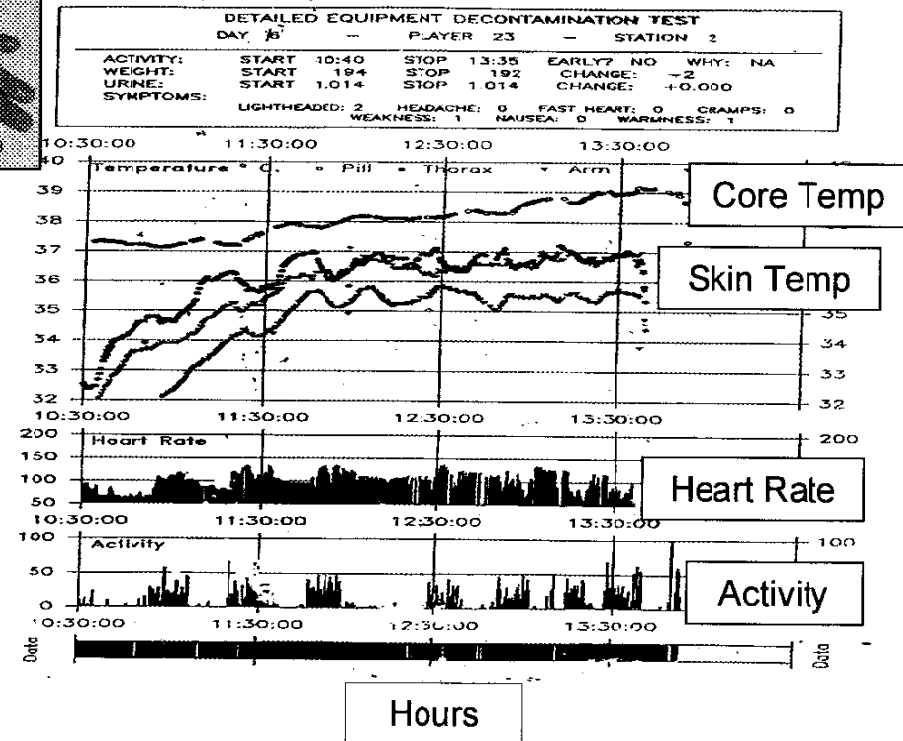


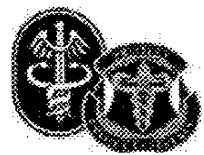
Biomedical Status Monitoring: Examples

Sustaining Performance: Managing Sleep



Preventing Casualties: A Soldier in MOPP Gear





Sustaining Soldiers in Operations

- Operational medical surveillance/situational awareness
 - individual, real-time biomedical monitoring
 - integrated by artificial intelligence-based adaptive/predictive modeling
- Support operational planning, focused command/medical intervention, casualty prevention, and early treatment